The Military Science of International Environmental Security

By COL W. Chris King, Ph.D.

Professor and Head

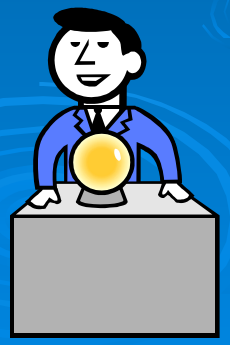
Department of Geography and Environmental Engineering

United States Military Academy

Outline

- Why we study environmental security
- Define environmental security
- Explain environmental security as an element of our national security strategy
- Building an Environmental Security Crystal Ball

What in the World is Worth Fighting For?



Preamble to the Constitution

"Provide for the common defense, promote the general welfare, and secure the blessing of liberty to ourselves and our posterity"

What are these blessing of liberty 'we' so value that we would risk our lives to protect

From the -- The Declaration of Independence

…… ***that they are endowed by their creator with certain unalienable rights, among these are, life, liberty, and the pursuit of happiness.***

Questions

- Where is most of the world in this hierarchy?
- Where is the United States and the western world?
- What happens when people don't have their fundamental needs met??

So where does that leave us in our discussion of environmental security ?

“ …national security is not just about fighting forces and weaponry. It relates to watersheds, croplands, forests, genetic resources, climate and other factors that rarely figure in the minds of military experts and political leaders,”

Norman Myers, *The Environmentalist*, 1986

Defining Environmental Security

DOD Definition of Environmental Security

"Definitions: 2. Environmental Security. The environmental security program enhances readiness by institutionalizing the Department of Defense's environmental, safety, and occupational health awareness, making it an integral part of the Department's daily activities. Environmental security is comprised of restoration, compliance, conservation, pollution prevention, safety, occupational health, explosive safety, fire and emergency services, pest management, environmental security technology, and international activities which are explained, as follows:

a. Restoration is identification, evaluation, containment, treatment, and/or removal of contamination so that it no longer poses a threat to public health and the environment.

b. Compliance is meeting applicable statutory, Executive order, and regulatory standards for all environmental security functions, including FGS or the Overseas Environmental Baseline Guidance Document, as appropriate.

c. Conservation is planned management, use, and protection; continued benefit for present and future generations; and prevention of exploitation, destruction, and /or neglect of natural and cultural resources.

d. Pollution prevention is source reduction as defined in 42 U.S.C. 13101-13109 (reference(nn)), and other practices that reduce or eliminate the creation of pollutants through increased efficiency in the use of raw materials, energy, water and other resources, or protection of natural resources by conservation.

e. Safety is a multifaceted program designed to prevent accidental loss of human and material resources, and protects the environment from the potentially damaging effects of DoD mishaps.

f. Occupational health protects personnel from health risks, and includes occupational medicine, illness and injury trend analysis, epidemiology, occupational health nursing, industrial hygiene, and radiological health.

g. Fire and emergency services enhance combat capability by preserving life and DoD property through fire suppression, fire prevention, fire protection engineering, and emergency responses.

h. Explosives safety protects personnel, property, and military equipment from unnecessary exposure to the hazards associated with DoD ammunition and explosives; and protects the environment from the potentially damaging effects of DoD ammunition and explosives.

i. Pest management is the prevention and control of disease vectors and pests that may adversely affect the DoD mission or military operations; the health and well-being of people; or structures, material, or property.

j. Environmental security technology consists of research, development, test and evaluation, and regulatory certification of innovative technologies responsive to user needs.

k. International environmental activities include bilateral or multilateral agreements, information exchanges, cooperative agreements, and specific actions; consistent with the responsibilities identified in subsection E.3. above to bring DoD resources to bear on international military-related environmental matters or otherwise appropriate in support of national defense policy interests.

Environmental Security Defined

Environmental security is a process that effectively responds to changing environmental conditions that have the potential to reduce peace and stability in the world. Accomplishing our national environmental security goals mandates planning and execution of programs to prevent and mitigate anthropogenically induced adverse changes in the environment. Further, detailed planning is required to develop effective response mechanisms to minimize the impacts over the range of environmental disasters.

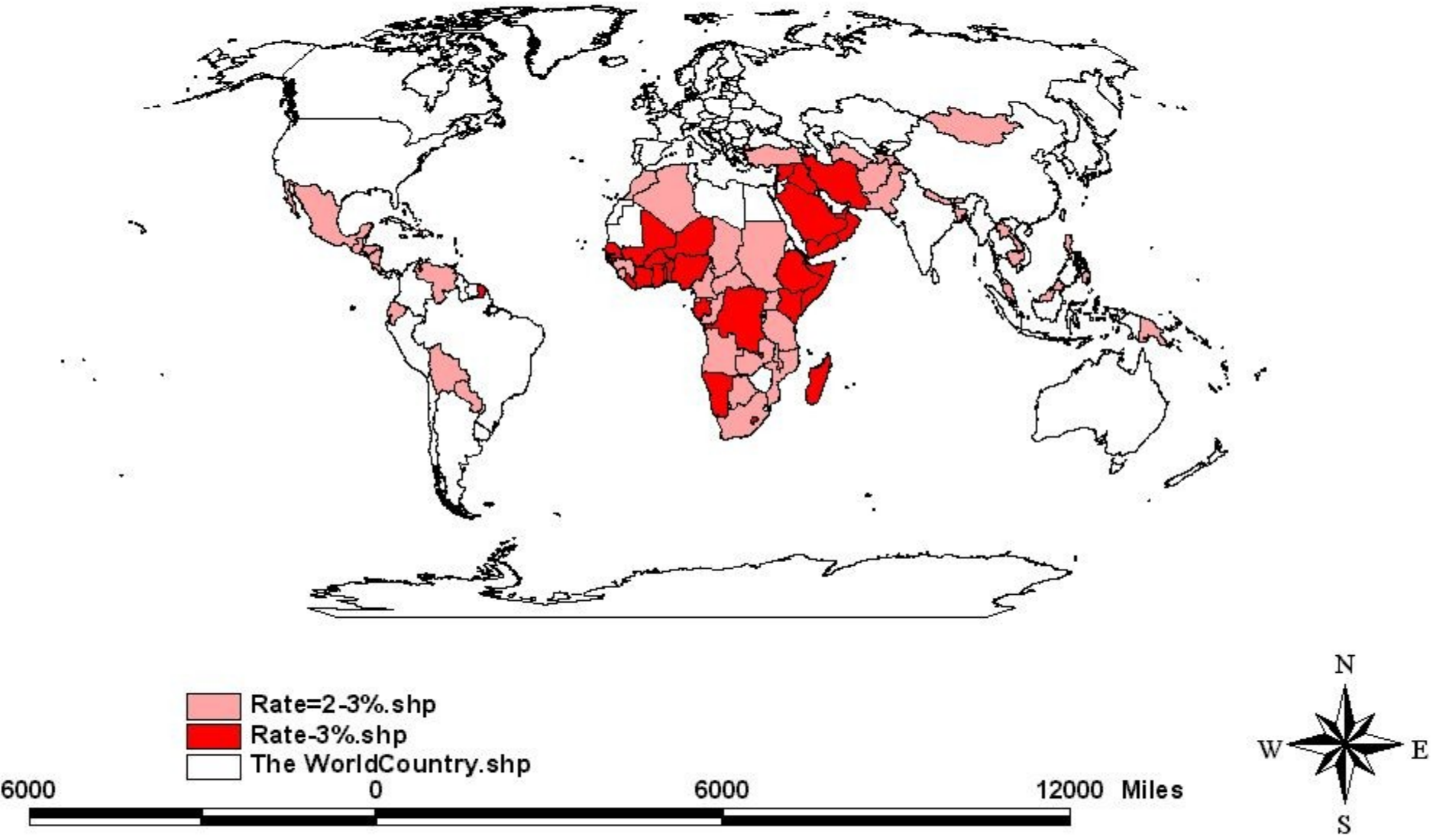
Is this Science or Politics?

YES, both

Science of Environmental Security

- Water as a Scarce Resource
  - Fresh Water
  - Oceans
- Global Climate Change
  - Carbon dioxide and greenhouse gases
  - Global warming
  - El Nino / La Nina
  - Ozone depletion in the stratosphere
- Land Use – protection of Arable lands
  - Deforestation-- Biodiversity and the rainforests
  - Desertification
  - Waste disposal – hazardous and solid wastes
- Energy Resources
  - Food
  - Heating and cooking
- Health Protection

Figure 3 - 3
Population Natural Growth Rates



Source: Rand McNally, Goode's World Atlas, 1995, pg 27.

Countries with Extreme Water Scarcity

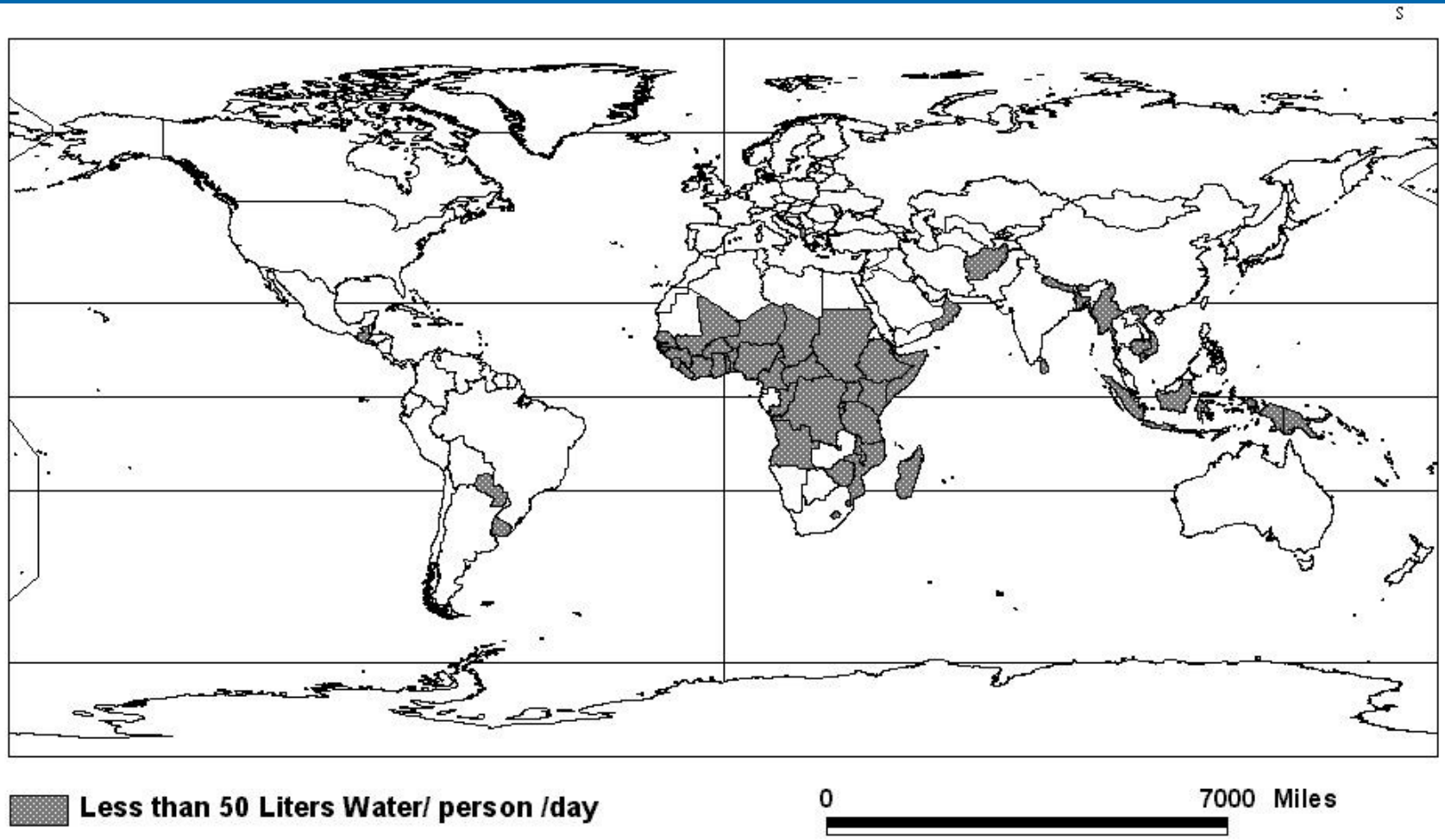


FIGURE 4 - 4
Correlation of Water Scarcity with Population Growth Rates

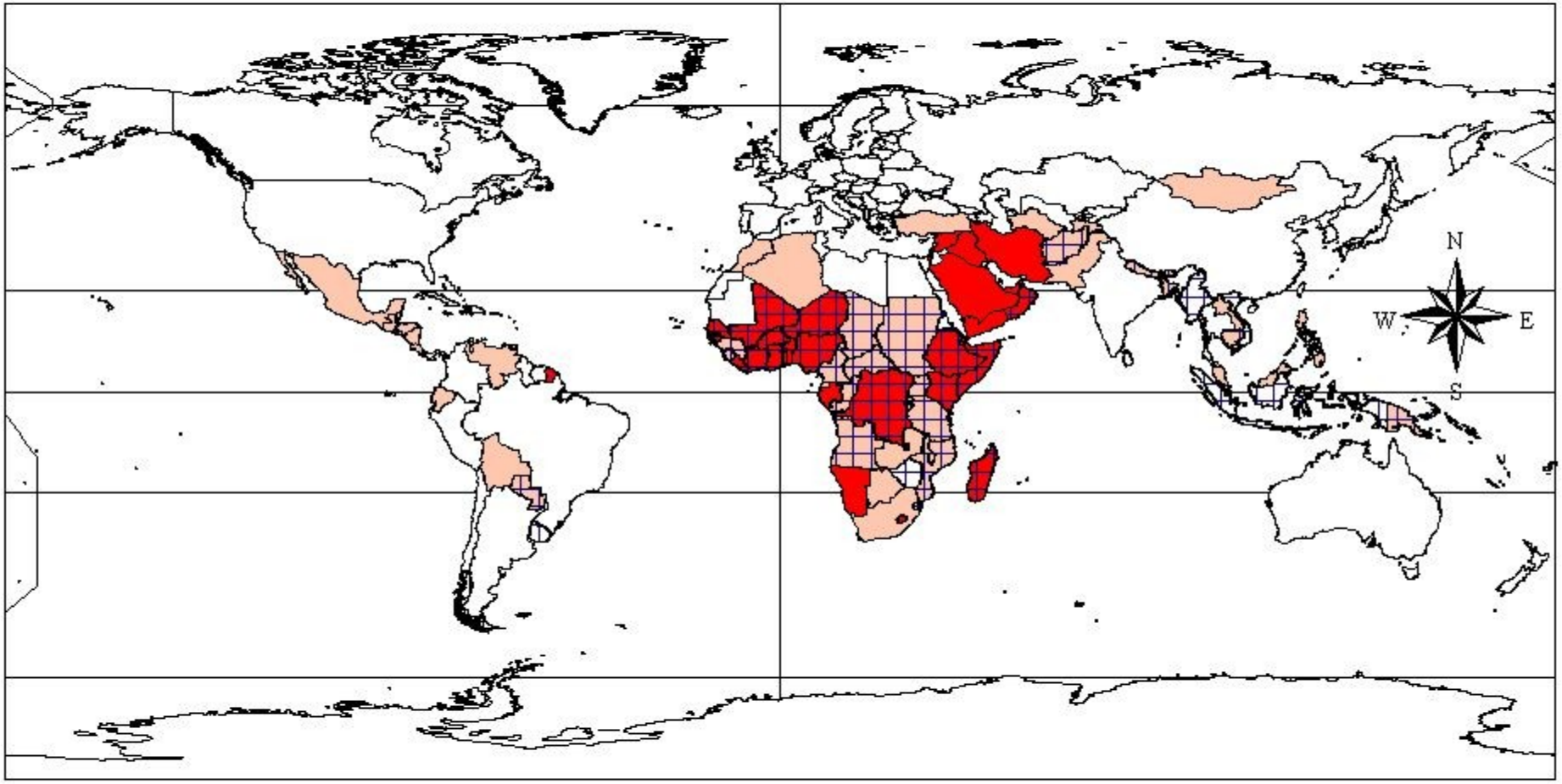
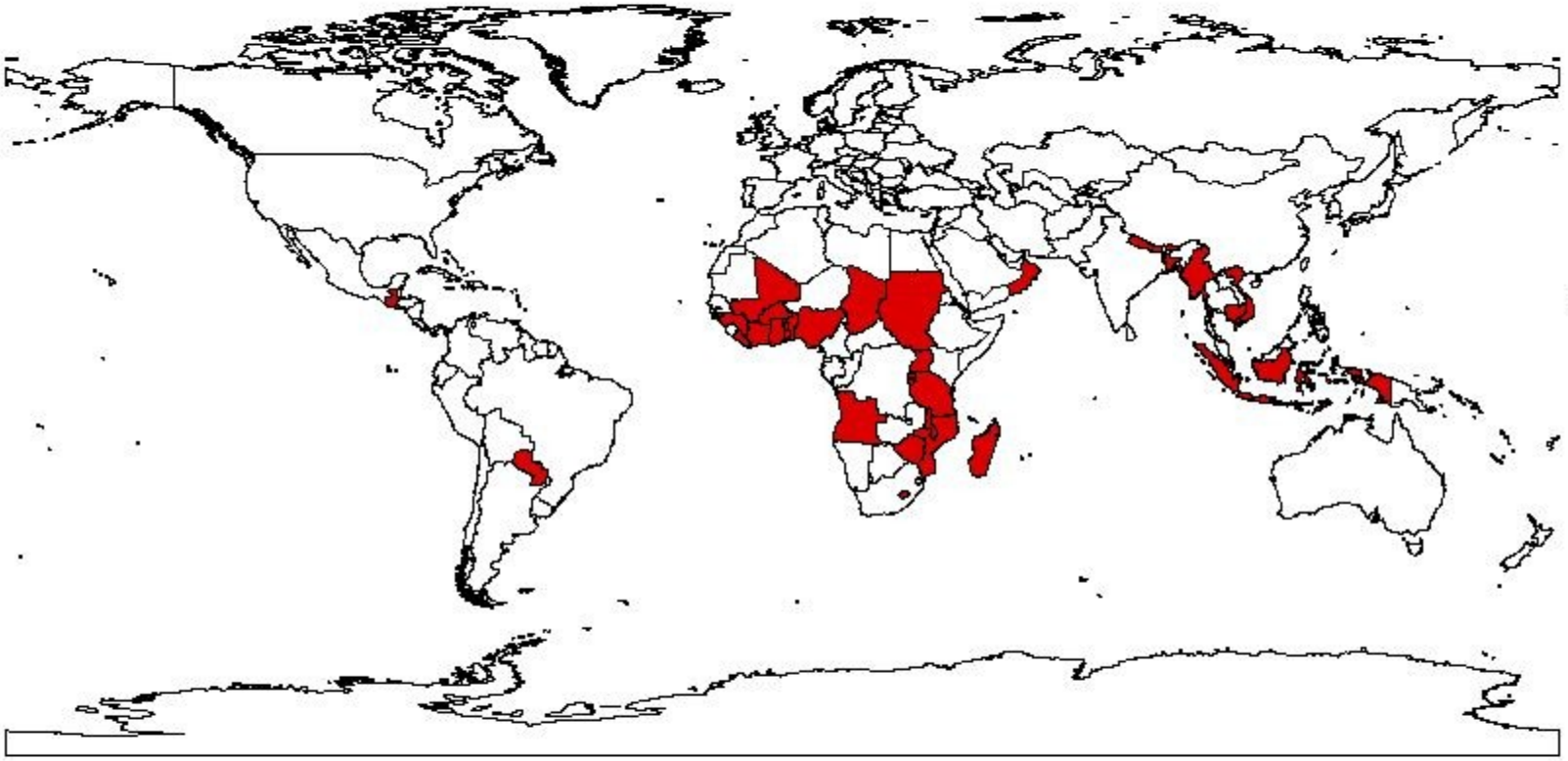
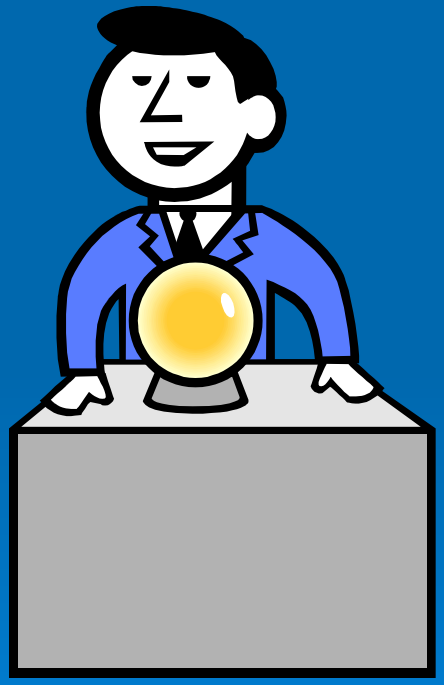


FIGURE 4 - 7
Areas of Deforestation and Water Scarcity



Building a Crystal Ball



- Population is the independent variable
  - Picking a population statistic is a challenge
  - Rate of Natural Increase is a good measure of population change for this analysis
- Environmental parameters can be strongly correlated to social political stability 99 to 99.9 5 by Test of Independence

THE RING OF FIRE

ENVIRONMENTAL SECURITY IN THE PACIFIC COMMAND

*EV-487A – **Environmental Security***

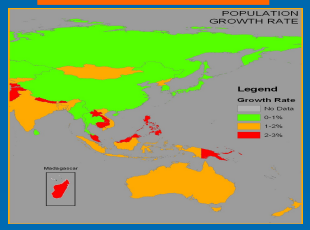
Pacific Command Area of Responsibility

Environmental security is the process of responding to environmental issues that could potentially affect U.S. national security, and it is a part of the U.S. National Security Strategy. This project is tasked and designed to correlate environmental security issues with the overall stability of the Pacific Command area of responsibility. To do this we have analyzed various environmental indicators, such as population, water, health, nutrition, pollution and urbanization. Correlating this data with current destabilizing regions according to social, economic and historical data, our group will show the correlation between current risk areas and environmental factors.

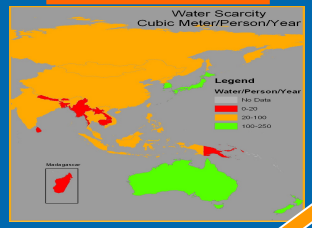
ENVIRONMENT

Communist Party

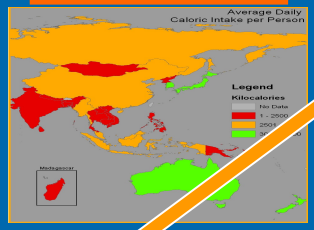
Population trends serve as good indicators for stability within a region because there is a direct correlation between population and environmental stress. The more people that draw off of an area's resources, the more that area's environment will be taxed. The best indicator of population trends is rate of natural increase, although others such as birth rates, mortality rates, infant mortality rates, and age/gender structure can be helpful as well. Examining the population dynamics pyramids and data facts for each country within the region collects this data.



Water Scarcity can also be used as an indicator of the level of stability in a region. Countries that have large amounts of growth rates in conjunction with low water supplies will have a greater chance of a destabilizing event. Lack of water that a person has to live on can serve as a destabilizing factor in the region and can lead to a decrease on that region's environmental security. This information was ascertained through water data collected world wide and published in a yearly data book by Peter Gleick.



Health and nutritional data can be used to indicate a region's stability because it demonstrates the quality of living of the people within the region and can therefore be directly linked to that region's stability. Additionally, health and nutritional data relates to security. If the people of a nation are either generally in poor health or are under fed, then that region is not going to enjoy great stability and because of that, will not enjoy a high level of security either. Examining and collecting countries' individual health facts through a variety of different sources attained this data.



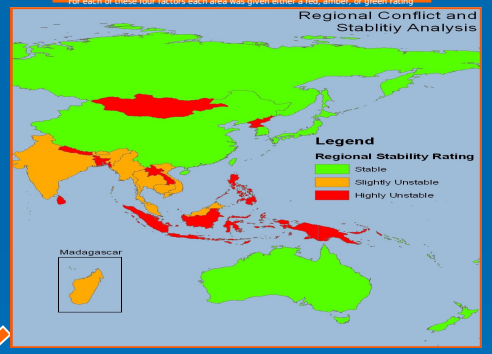
REGIONAL STABILITY

Chinese soldiers on the march

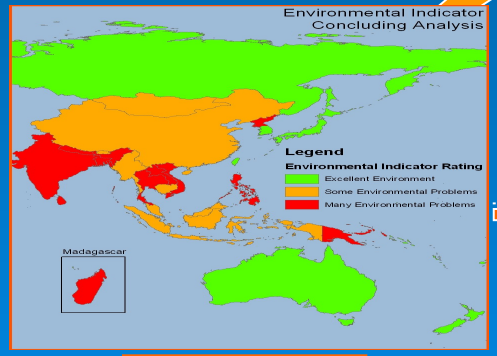
In order to determine the overall stability, not the environmental stability, of the areas within the PACOM AOR, four different factors were taken into account and given a rating of green (stable), amber (semi-stable) and red (instable). The four factors analyzed were economic stability, recent conflict within the area, the plurality of the population, and the social stability of the areas. Each of these factors were based on a variety of different aspects of the areas.

- Economic Stability includes: annual GDP, recent economic trends, economic production base, and net private capital flows.
- Recent Conflicts includes: civil wars, regional conflicts, and interstate wars between 1991 and 2001.
- Plurality of Population includes: refugee flow, percent minorities, and linguistic diversity.
- Social Stability includes: the Index of Human Development, Literacy Rates, Caloric intake, and demographics.

For each of these four factors each area was given either a red, amber, or green rating



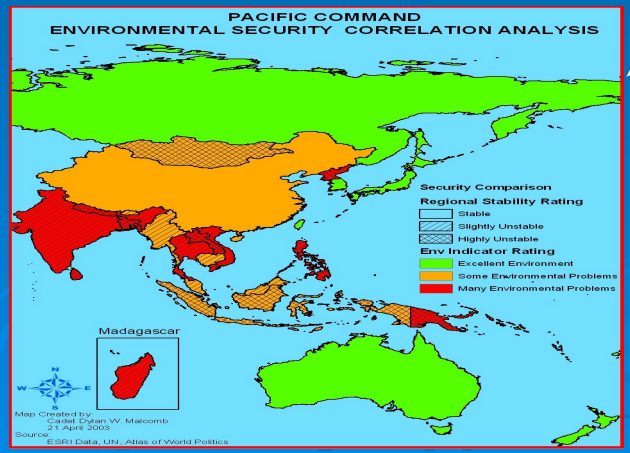
ENVIRONMENTAL SECURITY



Our project team's environmental indicator analysis is a comprehensive compilation of a series of pre-designated environmental issues.

Regions are highlighted from green (with the most stable environments) to red (with the most environmental concerns). To form the final map we used a series of indicators and weighted their importance to form an average score.

The final map above illustrates the concluding analysis dealing with each nation's environment.



CONCLUSION

Our analysis concludes that there is indeed a strong correlation between the environmental indicators that our group analyzed (Water, Population, Urbanization, Agriculture, Land Use, Pollution, Health and Nutrition) and the Socioeconomic factors that are currently used to analyze stability (Economy, Culture, Historical Conflicts and Government). This correlation supports our thesis that nations suffering from several environmental problems tend to have societies in conflict.

Using this conclusion, our project team has assessed that regions indicated on the map in red with cross- hatches are *At-Risk* countries that may cause conflict or destabilizing affects for the PACOM region in the future.

PROJECT TEAM

Dylan Malcomb

Dylan Reeves

Phil Zapien

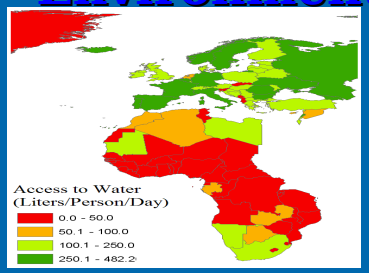
EUCOM

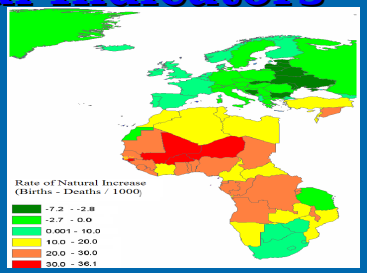
The European Command and Environmental Security

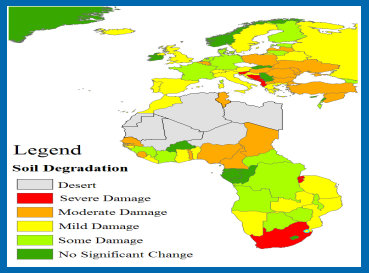
Project Overview

The goal of this project is to identify environmental factors within EUCOM that might lead to future conflict. Once these factors are identified, work in these areas can be focused to mitigate these factors and prevent future disputes over resources. The first step was identifying environmental indicators that would allow us to determine the overall wellbeing of a population, and what resources they had and what they lacked. These factors were assembled and analyzed using Geospatial Information Systems. Next, areas of political instability were identified. Instability was overlaid with environmental indicators to determine if a correlation was present, and to see if instability could be explained with environmental factors. Finally, this is used to predict future conflict within EUCOM.

Environmental Indicators







Water Availability

This Environmental indicator is defined as the amount of clean water available for use for each person in liters per day. Peter Gleick, in his book The World's Water defines the minimum amount of water for daily processes as 50 liters per person. Anything less than this amount, and people will not be able to meet all of the minimum requirements for drinking, sanitation, bathing, and food preparation. Water availability is a good indicator of how healthy a society is and provides important information about the overall well being of a population.

Land Degradation

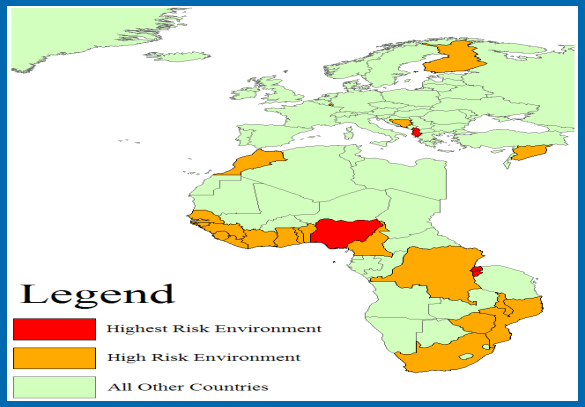
Land Degradation is defined by the United Nations Environmental Programme as the amount of damage done to soil through various natural and human induced processes. The UN defines four different categories of soil degradation based upon the severity of the degradation, and the amount of area that the degradation covers. This indicator does not take into account which type of degradation is present, only its severity and the area it covers. However, this is a very important indicator because it gives insight into trends such as desertification. This variable has a significant impact on a country's ability to grow food to sustain its population. As a result, this indicator gives an idea of a country's current land use and an idea of its future capabilities to support its own population.

Rate of Natural Increase

The Rate of Natural Increase is defined as the Crude Birth Rate subtracted by the Crude Death Rate. The resulting number gives the population based on how fast the population is multiplying, and not how fast it is growing or reducing based upon other factors such as immigration and emigration. This is important because it shows which countries are growing rapidly. A rapidly growing population is difficult to handle, and a country can quickly be overwhelmed by an [illegible] population. On the other hand, decreasing Rates of Natural [illegible] population becomes [illegible], a decreasing Rate [illegible] large population [illegible] cause it brings in [illegible] analyze what [illegible] ing.

Combining Environmental Indicators

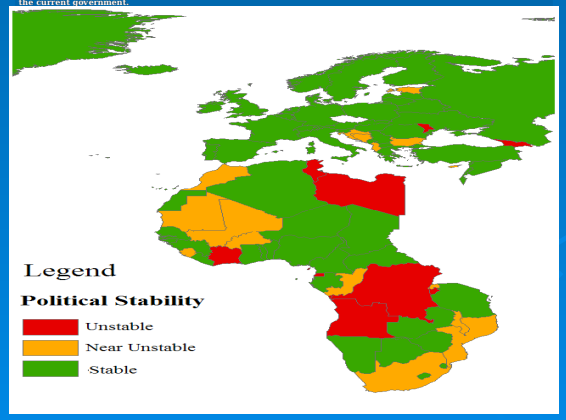
Several Environmental Indicators were used in the creation of this map. Population density, Rate of Natural Increase, Availability of clean water, Deforestation, and Soil degradation were all incorporated. Various greenhouse emissions were also considered, but were not used in the making of this compilation. This map ultimately reflects those countries who are in the highest concern bracket of multiple environmental indictors and those countries that are in the next highest bracket of concern of multiple environmental indicators.



Regional Stability

Regional Stability

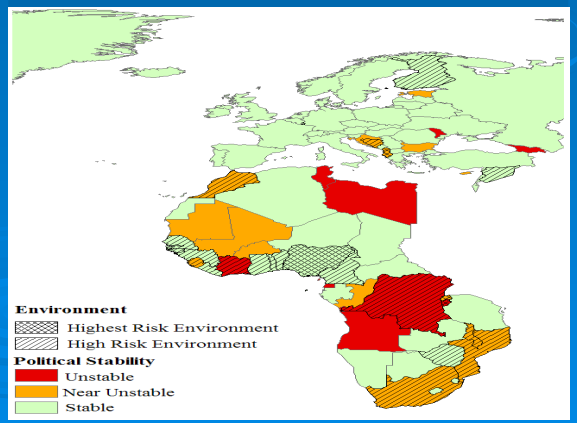
This map indicates the relative stability of the countries within EUCOM. The stability of a country was determined by studying the political pressures within a country and the succession of power over the last decade. The data used is from the CIA World Fact Book. Areas marked in red indicate significant opposition to the current regime or a recent history of conflict in the succession of power. Areas marked in amber indicate countries that have political problems, but no armed conflict. Areas marked in green are considered relatively stable, with little opposition to the current government.



Model

Conclusion

There is some correlation between our environmental indicators and the present security situation of the world. This is most obvious in the southern part of Africa, including South Africa, Rwanda, and Burundi. There are currently several countries that show environmental problems but have not developed instability yet. We believe these are the most important areas to watch for future conflicts or humanitarian problems. The most notable of these areas to watch are the coastal nations of sub-Saharan Africa.



This project presented by Team EUCOM of EV487.
Team Leader: Kevin Manley, Environmental Science Major
Group Members: Joshua Williamson, GIS Major
Ben Jackman, Environmental Science Major
Greg Smedley, Environmental Science Major

Afghanistan Facts

- 23.8 million, 12.3 million males -44m by 2025
  - 3.88 % growth rate, 3rd in the world
  - 2.59 % RNI
  - 6.80 fertility rate, 8th in the world
  - Life expectancy -43.1 years
  - Median age – 18 years
  - Infant mortality rate -147
- 13 % access to safe drinking water
  - 39L/day/person (minimum std is 50)
- 21% access to sanitation in 1970, 12% today
- Less than 3 % forest
- Percent arable lands – 12 % including forests
  - Food production dropped by 40% 1995 to 2000

A Strategic View

One picture is worth 1,000 words

YO! AMIGO!!
WE NEED THAT TREE TO PROTECT US FROM THE GREENHOUSE EFFECT!
!?
DEVELOPED COUNTRIES
WILLIS ©1991 SAN JOSE MERCURY NEWS

Summary

- Security is a much larger issue than wielding military power
- Peace is not the absence of war, but the existence of stable communities of people who have the basic human needs satisfied
- Protecting peace means assuring regional stability
- Environmental degradation is a major threat to peace and stability in the world
- There are global and regional environmental issues with the potential to cause war
- Solutions must work toward curing the basic problems not treating symptoms - - POPULATION +
  - Global Climate Change
  - Loss of arable lands
  - Water Issues
  - Deforestation